Before the
Federal Communications Commission
Washington, DC 20554

In the Matter of	)	
	)	
Preserving the Open Internet	)	GN Docket No. 09-191
	)	
Broadband Industry Practices	)	WC Docket No. 07-52

To: The Commission

COMMENTS OF CISCO SYSTEMS, INC.

CISCO SYSTEMS, INC.

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SUMMARY

Cisco Systems, Inc., the world's largest manufacturer of networking equipment and a market leader in the provision of network management solutions and applications that require appropriate network management, welcomes this opportunity to work with the Commission on the issues raised in this docket.

Cisco has long supported the principles underlying the *Internet Policy Statement*, and it continues to do so. The *Internet Policy Statement* has proved to be an effective tool in influencing providers' actions. Its principal value has not been in the context of enforcement action, but rather in its capacity to shape provider conduct and consumer expectations, and to thereby facilitate the organic development of the broadband market. Indeed, Cisco supports supplementing the existing *Internet Policy Statement* with a new principle designed to ensure the disclosure by broadband providers of information regarding all material terms of service.

However, the *Internet Policy Statement*'s success does not indicate that its principles must be codified as bright-line rules. One of the *Internet Policy Statement*'s chief strengths has been its recognition that the needs of consumers will best be served by a flexible approach that permits providers to respond to evolving circumstances in ways that best serve the interests of users and that subjects abuse to case-specific analysis reflecting the ongoing evolution of broadband networks. Such flexibility could well be undermined by rigid rules.

To the extent the Commission decides to adopt rules in this docket notwithstanding the above, it must take care to limit those rules to ensure that, as the Internet continues to evolve, the best interests of consumers will continue to be served. First, it should decline to adopt a pure nondiscrimination requirement, which would severely limit the ability of providers to respond to fast-changing market conditions and evolving consumer needs. Given that there have been

virtually *no* instances of anticompetitive discrimination within the United States, and that the broadband marketplace is competitive and becoming more so, there is simply no reason to impose arbitrary limits on the ways in which network services and applications may be offered to consumers. These limits will do nothing to protect consumers, and would instead threaten to depress investment in networks, applications, or both.

Second, the Commission should ensure that network operators maintain very broad latitude to manage their networks to respond to ever-changing traffic patterns and other developments. The growing demands placed on broadband networks threaten the user experience and the value of the network. Enhanced network management offers a viable and tailored means of addressing those demands. In contrast, the proposed "solution" offered by exponents of "neutrality" – namely, the deployment of excessive network resources not at all reflecting typical usage patterns – would impose huge costs on consumers and undermine the public interest.

Third, the Commission must preserve a wide berth for the provision of managed and specialized services outside the scope of whatever rules are applied to broadband Internet access service. Cisco applauds the Notice's recognition that consumers have benefitted from the offering of managed and specialized services, and that such services must be protected from whatever regulatory requirements are placed on "best effort" broadband Internet access service. The Commission should exercise great caution to ensure that managed services continue to thrive as the broadband ecosystem matures. At the very least, it must exempt such services from the scope of any rules adopted. In addition, however, it must be sure to define the class of excluded offerings as broadly as possible.

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Cisco Systems, Inc. ("Cisco") hereby submits these comments in response to the Commission's Notice of Proposed Rulemaking in the above-captioned dockets.[1] Cisco is the world's largest manufacturer of networking equipment and a market leader in the provision of network management solutions and applications that require appropriate network management. It is also a leader in the development of managed internet protocol products and solutions used by individuals and enterprises throughout the world. Cisco looks forward to working with the Commission over the course of this proceeding to promote and safeguard the interests of consumers and of the American economy broadly. For the reasons discussed herein, Cisco urges the Commission to retain the 2005 *Internet Policy Statement* in its current, flexible form, and to avoid the adoption of prophylactic rules that are likely to distort the market and undermine consumer welfare. To the extent the Commission does adopt rules here, Cisco urges it to eschew the contemplated pure nondiscrimination rule, to preserve providers' flexibility to engage in robust network management, and to ensure a wide berth for the development and offering of value-creating managed services.

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[1] *Preserving the Open Internet, Broadband Industry Practices*, Notice of Proposed Rulemaking, 24 FCC Rcd 13064 (2009) ("*Notice*").

I. THE FLEXIBLE *INTERNET POLICY STATEMENT* PRINCIPLES, WHICH CISCO HAS LONG SUPPORTED, HAVE APPROPRIATELY POLICED THE BROADBAND INTERNET ACCESS MARKETPLACE.

As an initial matter, Cisco emphasizes that it supports the *Internet Policy Statement*,[2] and applauds the important role it has played in policing the broadband market. Cisco has been involved in the "network neutrality" discussion from the beginning as a participant in the drafting of the High-Tech Broadband Coalition's ("HTBC") "connectivity principles," and has long supported the policies reflected in the *Internet Policy Statement*. In a September 2003 letter and several subsequent filings, the HTBC urged the adoption of four specific "connectivity principles."[3] The *Internet Policy Statement* largely reflected those principles.

The *Internet Policy Statement* has proved to be an effective tool in influencing providers' actions. The day it adopted the *Internet Policy Statement*, the FCC warned that "if we see evidence that providers of telecommunications for Internet access or IP-enabled services are violating the[] principles, we will not hesitate to take action to address that conduct."[4] But the history of the broadband ecosystem since this statement has proven beyond doubt that the *Internet Policy Statement*'s principal value has not been in the context of enforcement action – which, of course, has only occurred *once* in the *Internet Policy Statement*'s four-and-a-half-year lifespan – but rather in its capacity to shape provider conduct, and to thereby facilitate the organic development of the broadband market. For example, the *Internet Policy Statement* articulates the FCC's expectations regarding how providers may and may not behave vis-à-vis their customers. It also helps to ensure that users understand their entitlement to access the

[2] *See Appropriate Framework for Broadband Access to the Internet Over Wireline Facilities*, Policy Statement, 20 FCC Rcd 14986 (2005) ("*Internet Policy Statement*").

[3] High Tech Broadband Coalition Letter to Chairman Powell, CS Docket No. 02-52; GN Docket No. 00-185; CC Docket Nos. 02-33, 95-20 & 98-10 (Sept. 25, 2003) ("HTBC Letter").

[4] *See Appropriate Framework for Broadband Access to the Internet over Wireline Facilities*, Report and Order and Notice of Proposed Rulemaking, 20 FCC Rcd 14853, 14903 ¶ 96 (2005).

content and applications of their choice, prompting consumers to seek out competitive options in the event their own providers fail to live up to the *Internet Policy Statement*'s standards. In short, the *Internet* Policy Statement has, in its current form, played a critical role in shaping the norms of the broadband marketplace.

Indeed, Cisco supports supplementing the existing *Internet Policy Statement* principles with a new principle designed to ensure the disclosure by broadband providers of information regarding all material terms of service. This principle, which was reflected in the HTBC's original proposal,[5] would provide consumers with the tools necessary to make informed decisions regarding consumption decisions, and would thereby facilitate the workings of the competitive market.

The Commission should not, however, take the success of the *Internet Policy Statement* as an indicator that its principles must be codified as bright-line rules. One of the *Internet Policy Statement*'s chief strengths has been its recognition that the needs of consumers will best be served by a flexible approach that permits providers to respond to evolving circumstances in ways that best serve the interests of users and that subjects abuse to case-specific analysis reflecting the ongoing evolution of broadband networks. Even in the *Comcast Order*,[6] which took aggressive action to promote that Commission's vision of network openness, the Commission affirmatively "decline[d] to adopt prophylactic rules" regarding broadband interconnection and nondiscrimination, and instead declared its intent "to adjudicate disputes

[5] HTBC Letter at Attachment ("Consumers should receive meaningful information regarding their broadband service plans.").

[6] *Formal Complaint of Free Press and Public Knowledge Against Comcast Corporation for Secretly Degrading Peer-to-Peer Applications; Broadband Industry Practices Petition of Free Press et al. for Declaratory Ruling that Degrading an Internet Application Violates the FCC's Internet Policy Statement and Does Not Meet an Exception for "Reasonable Network Management"*, Memorandum Opinion and Order, 23 FCC Rcd 13028 (2008) ("*Comcast Order*").

regarding federal Internet policy on a case-by-case basis."[7] The Commission noted that this course was most appropriate, because "the Internet [is] new and dynamic" and "Internet access networks are complex and variegated."[8] Moreover, the Commission noted, the cautious, case-by-case approach was most consonant with "federal policy advocat[ing] the preservation of the 'vibrant and competitive free market' for Internet and interactive computer services."[9]

The *Internet Policy Statement*'s flexible approach is especially important in light of fast-paced technological change and a quickly evolving business environment. Providers manage packets for many reasons: To maintain network security, controlling the proliferation of spam, spyware, worms, and other "malware"; to provide parents and libraries appropriate discretion over the content accessed by children; to hamper the unlawful dissemination of intellectual property; and – perhaps most significantly – to ensure quality of service is maintained as the demands placed on the Internet skyrocket. Flexible case-by-case decisionmaking also helps ensure that as broadband applications change and innovate to meet future user needs, so too can network management tools needed to support those applications. Likewise, all participants in the Internet ecosystem require the freedom to adapt to quickly changing business circumstances. For example, the e-reader market is already evolving in a manner that shifts communications costs from consumers to device providers. It is reasonable to anticipate that as applications and devices become more sophisticated and bandwidth needs grow, this sort of cost-shifting will grow. Moreover, as the broadband Internet access market becomes more and more competitive, providers will seek various ways to differentiate themselves from one another, and are likely to develop – or contract for access to – innovative content and applications that can be offered over their networks. So, too, market evolution may well give rise to circumstances in which it is both

[7] *Id.* at 13045-46 ¶¶ 29-30.
[8] *Id.* at 13046 ¶ 31.
[9] *Id.* at 13046 ¶ 32.

efficient and equitable to allow three sided markets to develop among broadband end users, broadband services providers, and applications providers. The flexible approach of the *Internet Policy Statement* permits such evolution in the marketplace; the prophylactic rules proposed in the *Notice* might not.[10] The Commission should not substitute the consumer-friendly approach of the *Internet Policy Statement* for rigid rules that entrench the *status quo*.

II. IF THE COMMISSION ADOPTS RULES, IT SHOULD CAREFULLY LIMIT ANY OBLIGATIONS PLACED ON NETWORK PROVIDERS.

To the extent the Commission decides to adopt rules in this docket, it must take care to limit those rules to ensure that, as the Internet continues to evolve, the best interests of consumers will continue to be served. In particular, the Commission should (1) decline to adopt a pure nondiscrimination rule, (2) ensure that providers retain broad discretion to employ necessary network management techniques, and (3) preserve a broad exemption for managed services.

A. The Commission Should Not Adopt a Nondiscrimination Rule.

First, the Commission should decline to adopt the nondiscrimination requirement contemplated in the *Notice*. This rule would severely limit the ability of providers to respond to fast-changing market conditions and evolving consumer needs. Given that there have been virtually *no* instances of anticompetitive discrimination within the United States, and that the broadband marketplace is competitive and becoming more so, there is simply no reason to impose arbitrary limits on the ways in which network services and applications may be offered to consumers. These limits will do nothing to protect consumers, and would instead threaten to depress investment in networks, applications, or both.

[10] A rule governing the means and terms on which broadband providers must offer service would be analogous to a rule five or ten years ago requiring wireless providers to offer buckets of minutes or free handsets. Even where a requirement might seem appropriate and beneficial when adopted, market developments often force rapid change, rendering them archaic and inefficient.

Broadband providers have been investing billions of dollars to deploy next-generation networks and intelligent network management designed to accommodate the voice, video, and data traffic consumers wish to send. They are doing so in a highly competitive and often unforgiving marketplace that does not guarantee a return on their investment. The business rationale for this investment rests in no small part on the expectation that providers will be permitted to develop innovative business plans and technological offerings that differentiate their networks from those of their competitors. These expectations have fueled network deployment thus far, and will likely continue to do so.

A Commission rule barring "discrimination," however, would deeply undermine the prospects for such differentiation, and would in turn frustrate investment and innovation. The proposed rule could effectively commoditize broadband Internet access service, transforming the vibrant and diverse market – in which providers fight to appeal to consumers and to thereby win and retain customers – into a standardized, monotonous market characterized by mere undifferentiated carriage. This result would vastly increase the risks faced by providers contemplating investment in new facilities: Without any opportunity for product differentiation, providers would be denied any measure of confidence in their ability to recoup such investment, fundamentally altering the business case for new deployment. In short, the construction of next-generation broadband networks would be characterized by extremely high cost and risk, and limited opportunities for recoupment. Investment would drop, and consumers would suffer from diminished innovation and deployment in broadband networks.

Of course, a bar on packet discrimination would also have even more direct consequences for consumers. American broadband users rely on a broad range of applications, ranging from simple web browsing and email services to voice over Internet protocol and file-sharing to

distance learning to telemedicine to streaming media to real-time high-definition video. These applications vary widely in their thirst for bandwidth, as well as in their tolerance for latency and jitter.[11] Thus, the value of these offerings – and their ability to serve consumers' needs – depends in a very concrete way on the ability of a provider to "discriminate" between different packets based on the class of service, the source of the content, or other factors.

Given the potentially crippling costs that a nondiscrimination rule could impose on future deployment, the imposition of such requirements could only be justified by clear and compelling evidence that the market was failing, and that the injuries caused by such failure could best be avoided by the adoption of "neutrality" mandates. However, in the almost five years since the Commission adopted the *Internet Policy Statement*, no party has been able to make either showing. Indeed, the *Notice* itself cites only *two* domestic incidents of even arguably anticompetitive packet discrimination – the short-lived episode involving rural local exchange carrier Madison River Communications LLC (which predated the *Internet Policy Statement*) and the efforts of several cable providers to impede use of certain peer-to-peer applications.[12] The fact that years of experience without rules of the sort contemplated here have yielded virtually no complaints of anticompetitive activity seriously undermines the argument that such rules are necessary – particularly given the costs that nondiscrimination rules would impose.

Nor should the Commission credit arguments that a nondiscrimination rule is appropriate even in the absence of harm, because providers *might* face incentives to engage in anticompetitive discrimination in the future. This argument turns the Commission's pro-growth, pro-competition broadband agenda on its head. The Commission has found that the broadband

[11] *See* Paul Sanchirico, Vice President, Cisco Service Provider Unit, Presentation at the FCC Technical Advisory Process Workshop on Broadband Network Management 4 (Dec. 8, 2009), *available at* http://www.openinternet.gov/workshops/docs/ws_tech_advisory_process/Cisco%20FCC%20Network%20Management%20Presentation%20120809.pdf ("*Cisco FCC Presentation*").

[12] *See Notice* at ¶ 50.

Internet access market is competitive, and is becoming more so all the time.[13] Under these circumstances, one would expect instances of anticompetitive conduct to become *less* common, not *more* common, going forward. In the increasingly competitive broadband market, a provider found to be engaging in traffic degradation, blocking, or other anticompetitive behavior would quickly lose customers to its competitors. This competitive pressure has been extremely effective in ensuring that providers comply with the preferences of their users – and there is no reason to doubt that it will continue to be effective in the future.[14]

B. The Commission Should Ensure That Providers Retain the Ability to Engage in Robust Network Management.

Second, the Commission should make every effort to ensure that network operators maintain very broad latitude to manage their networks to respond to ever-changing traffic patterns and other development. The growing demands placed on broadband networks threaten the user experience and the value of the network. Enhanced network management offers a viable and tailored means of addressing those demands. In contrast, the proposed "solution" offered by exponents of "neutrality" – namely, the deployment of excessive network resources not at all reflecting typical usage patterns[15] – would impose huge costs on consumers and undermine the public interest.

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[13] *See, e.g.*, *Broadband Industry Practices*, Notice of Inquiry, 22 FCC Rcd 7894 ¶ 11 (2007) (noting "the ever increasing intermodal competition among broadband providers"); *Petition for Forbearance of the Verizon Telephone Companies et al., Pursuant to 47 U.S.C. § 169(c)*, Memorandum Opinion and Order, 19 FCC Rcd 21496 ¶ 22 (2004) (noting that, in the broadband services market, "actual and potential intermodal competition informs rational competitors' decisions concerning next-generation broadband technologies") (subsequent history omitted); *Petition of the Embarq Local Operating Companies for Forbearance Under 47 U.S.C. § 160(c)*, Memorandum Opinion and Order, 22 FCC Rcd 19478 ¶ 22 (2007) (noting that "available data suggests that there are a number of competing providers for [enterprise broadband] services nationwide and the marketplace generally appears highly competitive") (subsequent history omitted).

[14] At the very most, if the Commission does adopt some form of the proposed nondiscrimination rule, it should only adopt a requirement barring *anticompetitive* discrimination that results in substantial consumer harm. Absent these qualifiers, a blanket nondiscrimination requirement would affirmatively bar even practices that are widely recognized as enhancing consumer welfare.

[15] *See, e.g.*, Google Comments, WC Docket No. 07-52 at 24 (filed June 15, 2007).

Cisco is a market leader in developing and deploying network-management technologies that enable providers to meet consumer needs. Cisco has long been involved in creating technology to make networks operate more effectively and securely. From virtual private networks ("VPNs") to traffic shaping tools to quality of service applications, Cisco provides technologies that ensure that the right packets reach the right destinations at the right time. The use of these packet marking and packet identification techniques can allow service providers to offer better service by limiting volumes of certain types of traffic or by creating a virtual quality of service connection for specific traffic. Without these technologies, consumers will experience more traffic congestion in general and will subject applications (such as video) that require constant quality of service to the vagaries of the public Internet.

The records compiled the *Broadband Industry Practices* docket and other proceedings confirm that there are many valid and pro-competitive reasons why a broadband Internet access provider might wish to "manage" traffic on its network. As parties have made clear in the *Broadband Industry Practices* docket, Internet usage is increasingly driven by high-bandwidth applications including online gaming, video over IP, voice over IP, and peer-to-peer ("P2P") file-exchange services.[16] Indeed, Cisco forecasts that annual global IP traffic will exceed two-thirds of a zettabyte in 2013, over 90 percent of which will come from various forms of video (TV, video on demand, Internet, P2P). Internet video alone will account for over 18 exabytes of data per month in 2013, reflecting over 60 percent of all Internet traffic.[17] High-bandwidth offerings such as these involve the transfer of information in quantities that dwarf those associated with

[16] AT&T Comments, WC Docket No. 07-52, at 21-27 (filed June 15, 2007) ("AT&T Comments"); Verizon & Verizon Wireless Comments, WC Docket No. 07-52 at 16-19 (filed June 15, 2007) ("Verizon Comments"), 54; National Cable and Telecommunications Association Comments, WC Docket No. 07-52 at 19, 26-30 (filed June 15, 2007); Time Warner Comments, WC Docket No. 07-52 at 11, 15 (filed June 15, 2007) ("Time Warner Comments").

[17] Cisco Systems, Inc., *Visual Networking Index – Forecast and Methodology, 2008-2013, available at* http://www.cisco.com/en/US/solutions/collateral/ns341/ns525/ns537/ns705/ns827/white_paper_c11-481360_ns827_Networking_Solutions_White_Paper.html (last visited Jan. 12, 2010).

traditional e-mail, web browsing, and other applications that accounted for nearly all Internet traffic just several years ago.[18] At the same time, the applications that users rely on have become far less tolerant of network congestion, because gaming, voice over IP, and video over IP are much more sensitive than traditional applications to latency and jitter. In other words, it is becoming increasingly important that packets arrive at their destination, and arrive quickly, at the very same time that the network resources are being taxed by more widespread use of bandwidth-intensive offerings. As the Commission has recognized, "the volume of Internet traffic is increasing rapidly," resulting in the need for network operators to deploy tools to manage congestion on their networks to ensure that packets associated with latency- and jitter-sensitive applications arrive on time, and that the end user's experience is not disrupted by network congestion.[19]

Proponents of "net neutrality" often suggest that there is only one appropriate way to manage limited network resources – by adding capacity. But this is no solution at all. Providers *will* need to enhance capacity, and have spent billions of dollars doing so. However, reliance on new capacity alone to solve current bandwidth limitations would impose huge and unnecessary costs on consumers. Indeed, studies suggest that this approach would increase the cost of broadband access between $100 and $400 per subscriber per month.[20] Cisco's own research suggests that use of network management and quality of service can provide a 2.5 times increase in bandwidth on existing networks.[21] The absence of network management would require

[18] In 2013, Internet video will account for bandwidth equaling nearly 700 times the total traffic that traversed the US Internet backbone in 2000. *Id.*

[19] *Notice* at ¶ 8.

[20] *See, e.g.*, George Ford, Thomas Koutsky & Lawrence Spiwak, "The Efficiency Risk of Network Neutrality Rules," Phoenix Center Policy Bulletin No. 16 (2006); Richard N. Clarke, COSTS OF NEUTRAL/UNMANAGED IP NETWORKS 21 (2006); George Ford, Thomas Koutsky & Lawrence Spiwak, "Network Neutrality and Foreclosing Market Exchange: A Transaction Cost Analysis," Phoenix Center Policy Paper No. 28 (2007).

[21] *See Cisco FCC Presentation* at 17.

dramatically expensive expansions of network capacity. Supporters of regulation cannot explain why these costs should be borne by consumers, given that reliance on network-management techniques in addition to network expansions could solve congestion problems at much lower cost, and that no harm has come from use of such techniques. Solutions demanding exclusive resort to massive capacity enhancements fail to recognize that consumers only want and need *some* traffic to be subject to expedited handling; e-mail messages, web browsers, and similar applications are simply not affected by a microsecond's delay in nearly the same way that a video or gaming application might be. Moreover, even massive facilities deployment will never prepare the network for public-safety crises, pop-culture events, or similar occurrences, which draw traffic levels that are likely to overcome capacity and necessitate management irrespective of the extent of investment.[22] In short, network management and capacity enhancements effectively maximize the consumer experience as the lowest cost. Removing the network management tool will drive up costs, degrade the consumer experience, or both.

"Neutrality" advocates also fail to explain why network-based management tools should be forbidden even while applications providers remain free to utilize alternative content-distribution mechanisms. As several commenters explained in response to the *Broadband Industry Practices NOI*, content providers regularly employ various "content distribution networks" ("CDNs") designed to speed delivery of their offerings to end users.[23] These CDNs might be operated by content providers themselves such as Google (which has constructed its own CDN), or by third parties such as Akamai. Under these circumstances, a rule that barred network-based traffic-management solutions, but permitted use of CDNs by large content

[22] For example, following the death of pop star Michael Jackson in 2009, CNN.com saw twenty million page views, a five-fold increase in traffic in an hour-span. *See* Greg Sandoval, *News Sites Swamped Following Michael Jackson's Death*, CNET News, (June 25, 2009), http://news.cnet.com/8301-1023_3-10273325-93.html.

[23] *See, e.g.*, AT&T Comments at 19-21; Verizon Comments at 35; Fiber-to-the-Home Council Comments, WC Docket No. 07-52 at 33-36 (filed June 15, 2007).

providers to provide the same result, would be arbitrary and capricious. Such "nondiscrimination" regulation would also, ironically, be flatly discriminatory, preventing smaller users that cannot build their own CDNs or procure access to third-party CDNs from obtaining similar services from their broadband providers.

Thus, as the Commission considers the framework for evaluating reasonable network management practices, it should allow for maximum flexibility in any rules pertaining to network management to ensure that broadband providers remain free to engage in pro-competitive network management techniques to alleviate congestion, ameliorate capacity constraints, and enable the development of new services. In particular, the Commission must take care to preserve provider flexibility to pursue three major types of network management: (1) specialized IP routing of traffic; (2) packet differentiation (using the so-called "DiffServ model"); and (3) filtering. We briefly address each.

IP Routing. Internet service providers ("ISPs") rely on routing technologies to allow them to adhere to service level agreement guarantees in the face of network congestion and quality of service requirements. IP routing creates a virtual path that data will follow as it moves across a network or networks to its ultimate destination. Taken simply, within the network, data is directed, using the destination IP address in the packet header, according to forwarding tables used by routers based on a series of protocols. By employing IP routing that responds to prevailing traffic demands, broadband providers engineer traffic patterns to improve performance. IP routing technology innovations include multi-protocol label switching ("MPLS"), a data-carrying mechanism by which data packets are assigned labels and forwarding decisions are made solely on the basis of these labels, without the need to examine the packets

themselves. As a result, virtual links can be created between distant nodes using any protocol, further enhancing reliability.

Packet Differentiation ("DiffServ"). Originally envisioned by the Internet Engineering Task Force, the DiffServ model allows for IP quality of service distinctions to be applied to various groupings of network traffic.[24] Data will be classified into different classes of network traffic, which will define how that network traffic is forwarded as it flows across different routers in the network. Data traffic may be further conditioned by tools such as metering, marking, policing and shaping in order to adhere to service level guarantees or to address network challenges. These traffic tools can be used to reduce load peaks and queuing delays and to assure that the most important traffic goes out first. For instance, in a network that is subject to congestive collapse, traffic conditioning can be used by an ISP to ensure that the packets associated with an emergency government communication are transmitted with a minimum of loss or jitter.

Filtering. Finally, ISPs may employ traffic filtering in order to enhance network security.[25] Traffic filtering is a technique used to enforce access control policies in order to ensure network security and quality of service. By way of example, a network access control list can be used as a traffic filtering tool by an ISP to control inbound and outbound traffic. Such

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[24] *See* S. Blake et al., An Architecture for Differentiated Service, December 1998, *available at* http://www.ietf.org/rfc/rfc2475.txt; K. Nichols et al., Definition of the Differentiated Services Field (DS Field) in the IPv4 and IPv6 Headers, December 1998, *available at* http://www.ietf.org/rfc/rfc2474.txt; Service level agreements or applications provided by ISPs may require specific support under the DiffServ model as envisioned in the following: Heinanen et al., Assured Forwarding PHB Group, June 1999, *available at* http://www.ietf.org/rfc/rfc2597.txt; B. Davie et al., An Expedited Forwarding PHB (Per-Hop Behavior) March 2002 *available at* http://www.ietf.org/rfc/rfc3246.txt; A. Charny et al., Supplemental Information for the New Definition of the EF PHB(Expedited Forwarding Per-Hop Behavior) March 2002, *available at* http://www.ietf.org/rfc/rfc3247.txt; J. Babiarz et al., Configuration Guidelines for DiffServ Service Classes, August 2006, *available at* http://www.ietf.org/rfc/rfc4594.txt; K. Chan et al., Aggregation of DiffServ Service Classes, February 2008, *available at* http://www.ietf.org/rfc/rfc5127.txt.

[25] Accordingly, such filtering would fall squarely within the Commission's proposal that "broadband Internet access service providers [be able to] address harmful traffic or traffic unwanted by users as a reasonable network management practice." *Notice* at ¶ 138.

lists and more complicated filters allow an ISP to distinguish between traffic that is "safe" and traffic that is "harmful." If ISPs were deprived of the ability to filter their traffic, their options for responding to a network attack would be severely limited.

C. The Commission Should Ensure That Providers Remain Free to Offer a Wide Array of Managed Services.

Third, the Commission must preserve a wide berth for the provision of managed and specialized services outside the scope of whatever rules are applied to broadband Internet access service. Cisco applauds the Notice's recognition that consumers have benefitted from the offering of managed and specialized services, and that such services must be protected from whatever regulatory requirements are placed on "best efforts" broadband Internet access service.[26] The Commission should exercise great caution to ensure that managed services continue to thrive as the broadband ecosystem matures.

The class of managed services creating value in the American economy is large, and always growing larger. The Notice cites offerings such as eLearning applications, telemedicine and smart grid applications as key examples.[27] In the context of implementing the Recovery Act, the Rural Utilities Service and the National Telecommunications and Information Administration cited managed services relating to telemedicine, public safety communications, and distance learning, focusing on offerings relying on private network connections rather than the public Internet.[28] Parties before the Commission have identified a range of other managed services,

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[26] *Notice* at ¶¶ 148-53. The *Notice* explains that the "existence of [managed and specialized] services may provide consumer benefits, including greater competition among voice and subscription video providers, and may lead to increased deployment of broadband networks." *Id.* at ¶ 148. Notably, even the much-discussed AT&T/BellSouth merger condition relating to "net neutrality," which imposed temporary nondiscrimination requirements on the merged company, excluded "enterprise managed IP services" and the company's IPTV service from its reach. *See AT&T Inc. and BellSouth Corp. Application for Transfer of Control,* 22 FCC Rcd 5662, Appendix F (2007).

[27] *Notice* at ¶ 150.

[28] Broadband Initiatives Program; Broadband Technology Opportunities Program Notice, 74 Fed. Reg. 33104, 33111 (July 9, 2009).

including teledentistry, telepharmacy, telepsychiatry, remote patient monitoring, Metro Ethernet, wireless, VoIP, data center services, and disaster recovery center services.[29]

Cisco is itself a leader in the provision of the tools used to provide managed services. One prominent example is Cisco's high-definition TelePresence conferencing system. TelePresence creates an experience that is almost lifelike through the use of multiple high quality cameras, directional audio, and displays at twice the resolution of HDTV (using 1080P panels). TelePresence works across an IP network using the same technology as VoIP, but requires symmetrical connections of approximately 12 Mbps. The packets carrying TelePresence traffic require a highly managed network to deliver them at the appropriate time. The public Internet, unmanaged, is not currently capable of providing the consistent quality of service necessary to run enterprise quality TelePresence.

At bottom, the applications referred to as "managed" are generally linked by certain core characteristics – namely, the need for minimal latency, minimal jitter, guaranteed bandwidth, and – in at least some cases – heightened network security. Service providers that offer such services meet important needs of residential and business users, and thus add great value to the economy. However, application of the rules contemplated here to those offerings could effectively destroy the provider's capacity to offer them. To take only the most obvious example, a nondiscrimination requirement that barred the prioritization of certain content would be antithetical to the offering of managed services, given that prioritization is the essence of a managed service.

Thus, the Commission must work to ensure that providers retain the ability to develop and offer innovative new managed services to customers who value these products. At the very

[29] *See* Comments of Internet2, GN Docket Nos. 09-47, 09-51, 09-137, WC Docket No. 02-60, at 14 (filed Dec. 2, 2009); Comments of Alcatel-Lucent, GN Docket Nos. 09-47, 09-51, 09-137 at 11 (Dec. 4, 2009); OneCommunity, Ex Parte Presentation, GN Docket Nos. 09-47, 09-51, 09-137 (filed Nov. 11, 2009).

least, it must exempt such services from the scope of any rules adopted. In addition, however, it must be sure to define the class of excluded offerings as broadly as possible. Today, managed services are mostly offered over facilities entirely segregated from the "public Internet." Over time, however, it is likely that managed services –including Cisco's TelePresence – are likely to rely on customers' own Internet access links in the last mile, to the extent those links can be provisioned to ensure sufficient quality of service. Here again, however, application of rules such as those contemplated in this docket could preclude the offering of user-demanded services. The Commission must therefore ensure that current conceptions of "managed services" do not unduly narrow the class of offerings properly excluded from any rules adopted. Cisco looks forward to working with the Commission as it thinks through these challenging issues.

CONCLUSION

For the foregoing reasons, the Commission should retain the existing *Internet Policy Statement* – perhaps adding a new consumer disclosure principle – and decline to adopt the binding rules proposed in this docket. To the extent the Commission does adopt rules, it should (1) decline to adopt a pure nondiscrimination rule, (2) ensure that providers retain broad discretion to employ necessary network management techniques, and (3) preserve a broad exemption for managed services.

Respectfully submitted,

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